FIG.1 PRIOR ART

FIG.2 PRIOR ART

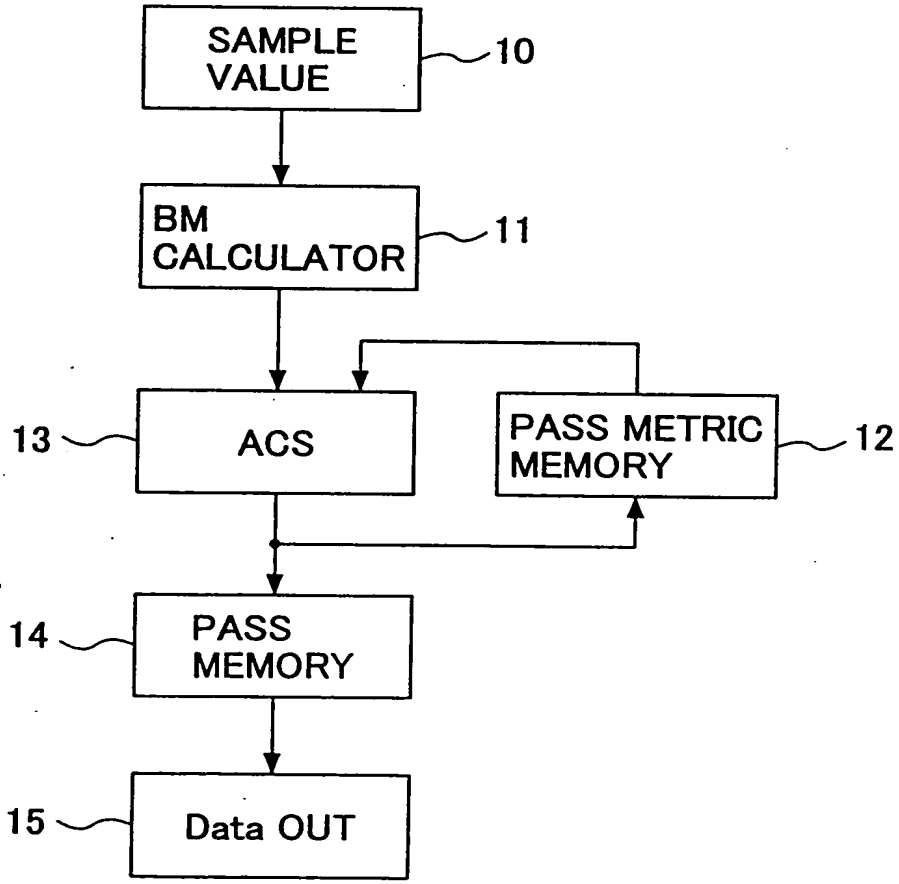

FIG. 3

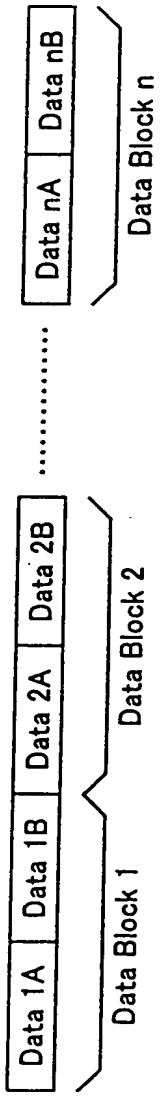
Data 1A
Data 1B
Data 2A
Data 2B
Data nA
Data nB
Data Block 1
Data Block 2
Data Block n

FIG. 4

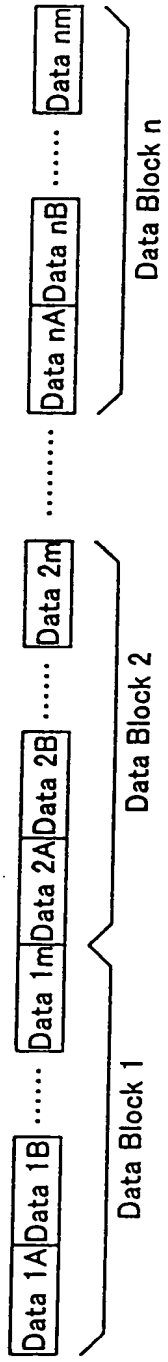
Data 1A
Data 1B
Data 1m
Data 2A
Data 2B
Data 2m
Data nA
Data nB
Data nm
Data Block 1
Data Block 2
Data Block n

FIG.5

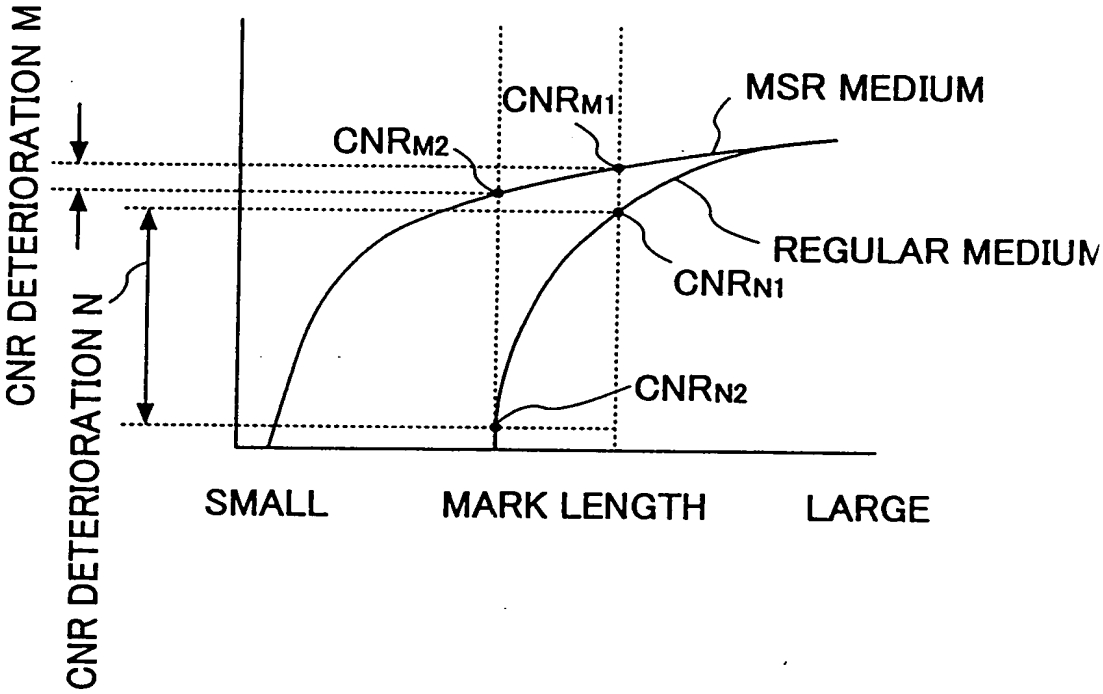
CNR DETERIORATION M
CNR DETERIORATION N
CNRM1
CNRM2
MSR MEDIUM
REGULAR MEDIUM
CNRN1
CNRN2
SMALL
MARK LENGTH
LARGE

FIG.6

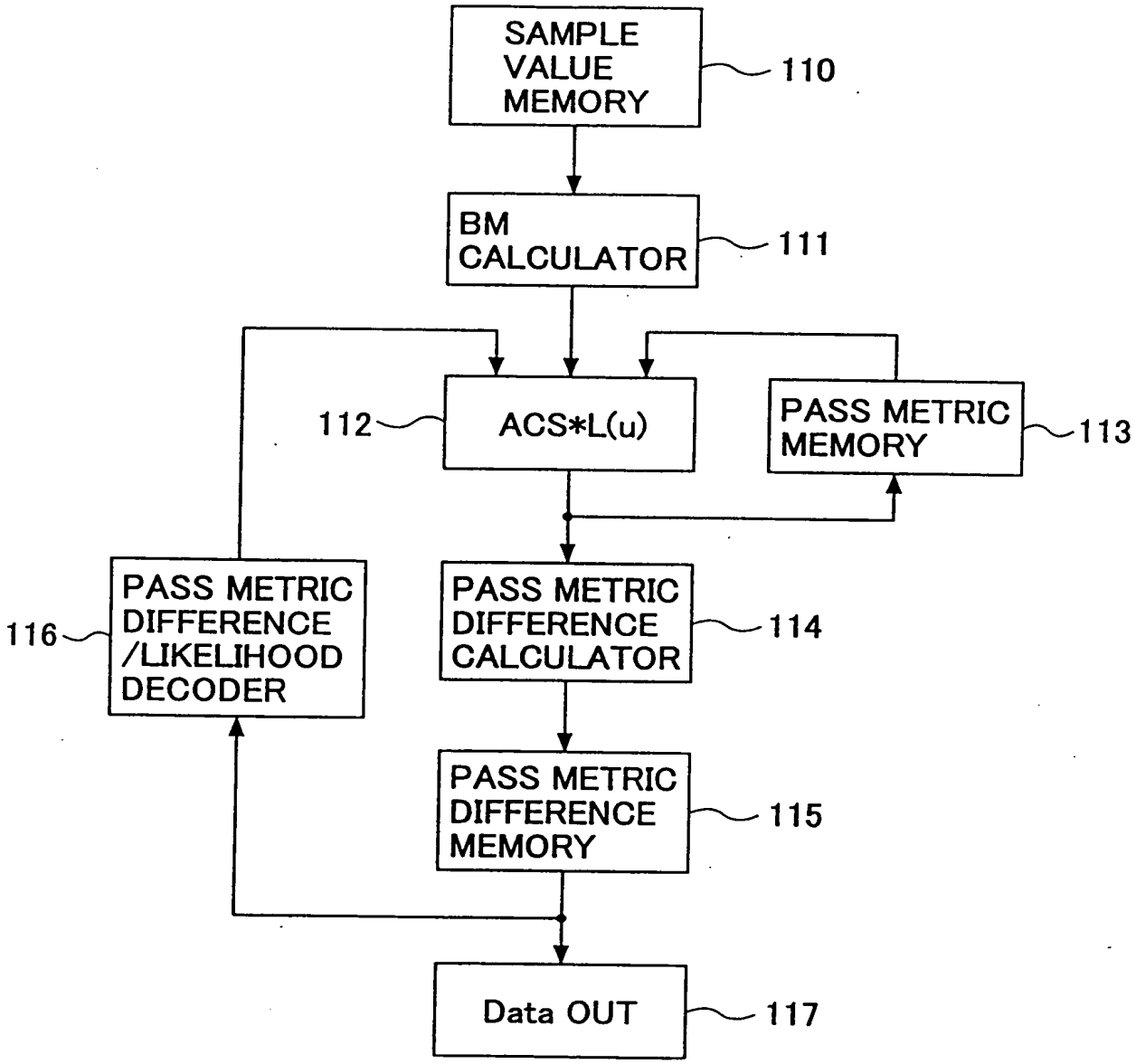
SAMPLE VALUE MEMORY
110
BM CALCULATOR
111
112
ACS*L(u)
PASS METRIC MEMORY
113
PASS METRIC DIFFERENCE /LIKELIHOOD DECODER
116
PASS METRIC DIFFERENCE CALCULATOR
114
PASS METRIC DIFFERENCE MEMORY
115
Data OUT
117

FIG.7

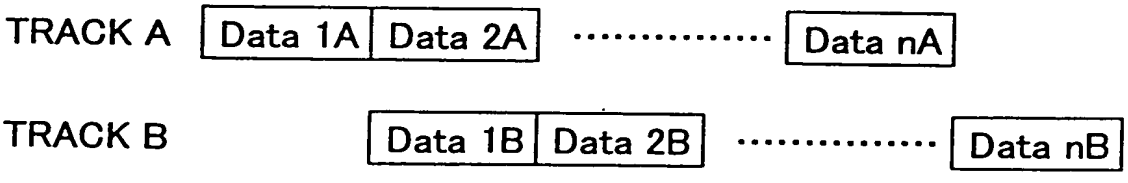
TRACK A
Data 1A
Data 2A
Data nA
TRACK B
Data 1B
Data 2B
Data nB

FIG.8

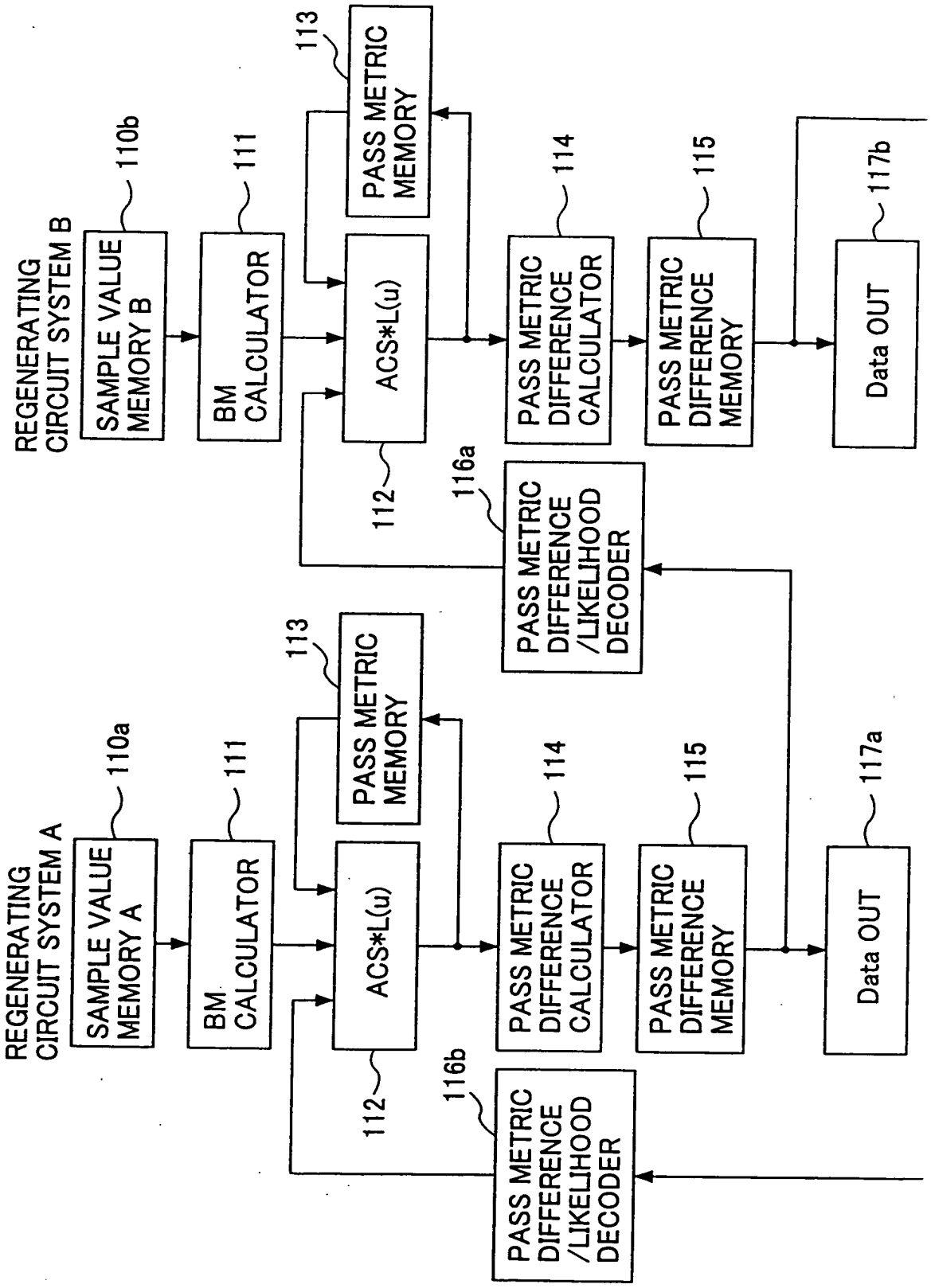
REGENERATING CIRCUIT SYSTEM A
SAMPLE VALUE MEMORY A
110a
BM CALCULATOR
111
ACS*L(u)
112
PASS METRIC MEMORY
113
PASS METRIC DIFFERENCE CALCULATOR
114
PASS METRIC DIFFERENCE MEMORY
115
Data OUT
117a
PASS METRIC DIFFERENCE /LIKELIHOOD DECODER
116b
REGENERATING CIRCUIT SYSTEM B
SAMPLE VALUE MEMORY B
110b
BM CALCULATOR
111
ACS*L(u)
112
PASS METRIC MEMORY
113
PASS METRIC DIFFERENCE CALCULATOR
114
PASS METRIC DIFFERENCE MEMORY
115
Data OUT
117b
PASS METRIC DIFFERENCE /LIKELIHOOD DECODER
116a

FIG.9

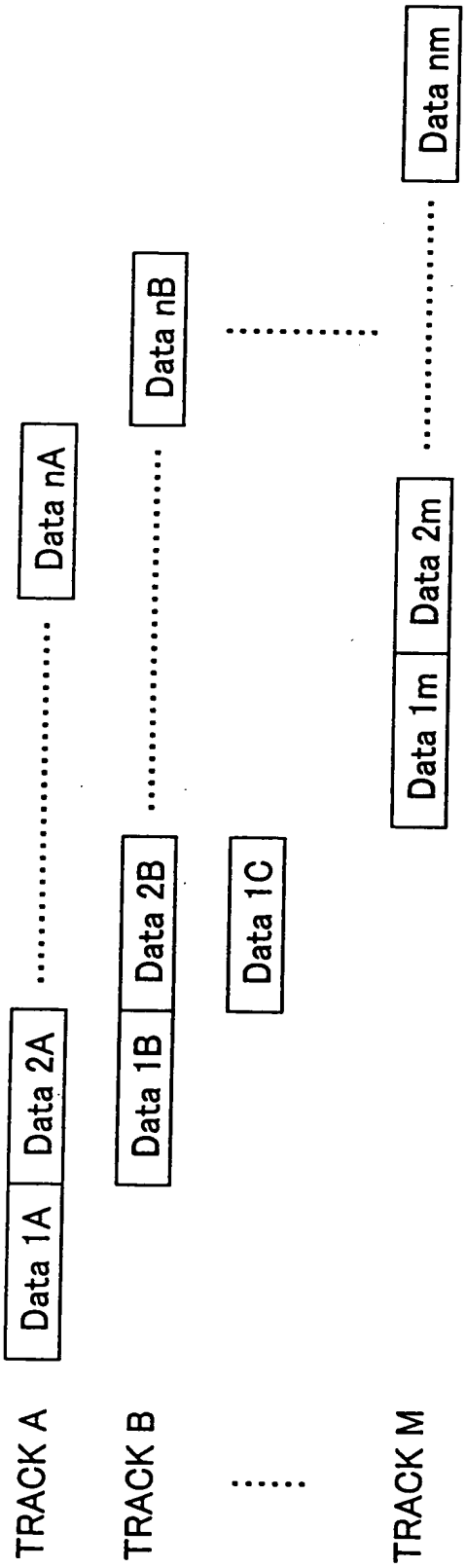
TRACK A
TRACK B
TRACK M
Data 1A
Data 2A
Data nA
Data 1B
Data 2B
Data nB
Data 1C
Data 1m
Data 2m
Data nm

FIG.10

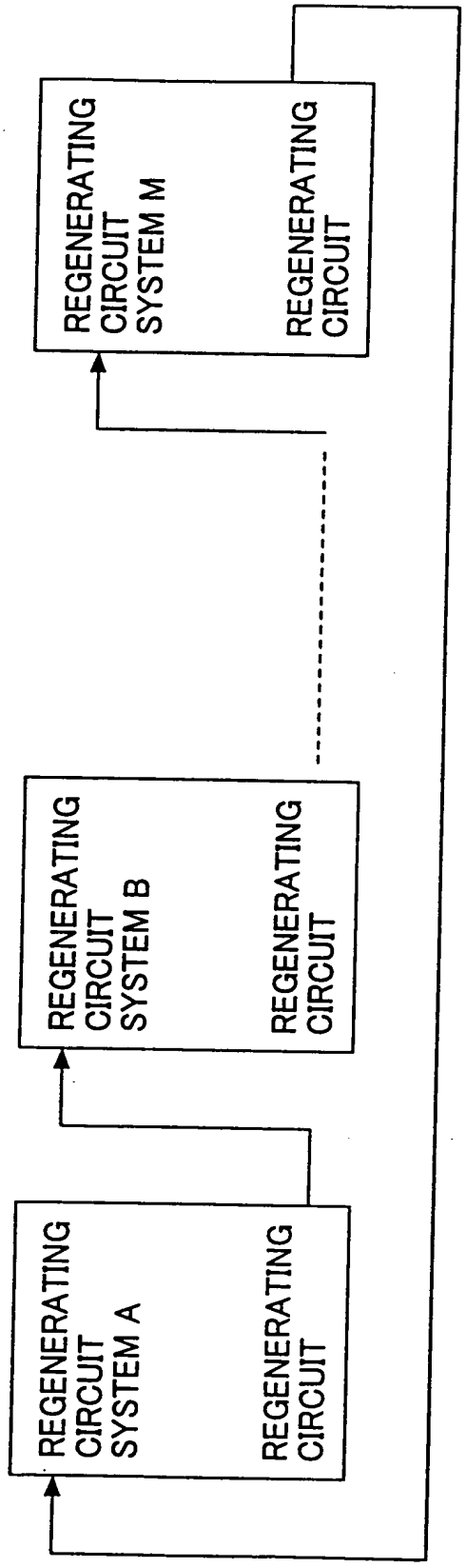
REGENERATING CIRCUIT SYSTEM A
REGENERATING CIRCUIT
REGENERATING CIRCUIT SYSTEM B
REGENERATING CIRCUIT
REGENERATING CIRCUIT SYSTEM M
REGENERATING CIRCUIT

FIG.11

TIME	t−1	t	EXPECTED VALUE Ph
	0	0	P0=0
DATA SEQUENCE	0	1	P1=1
	1	0	P2=1
	1	1	P3=2

FIG.12

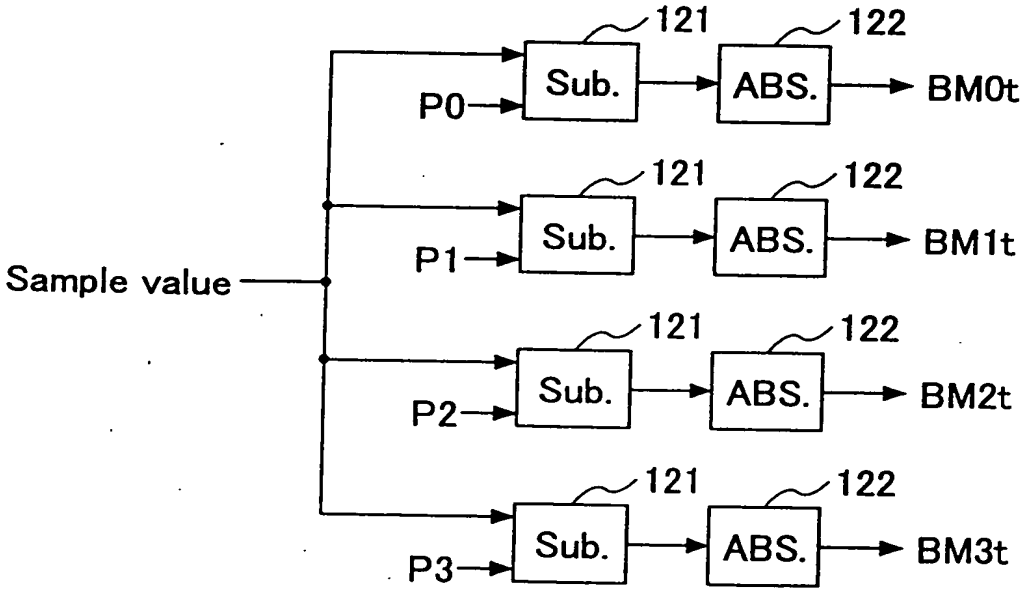

FIG.13

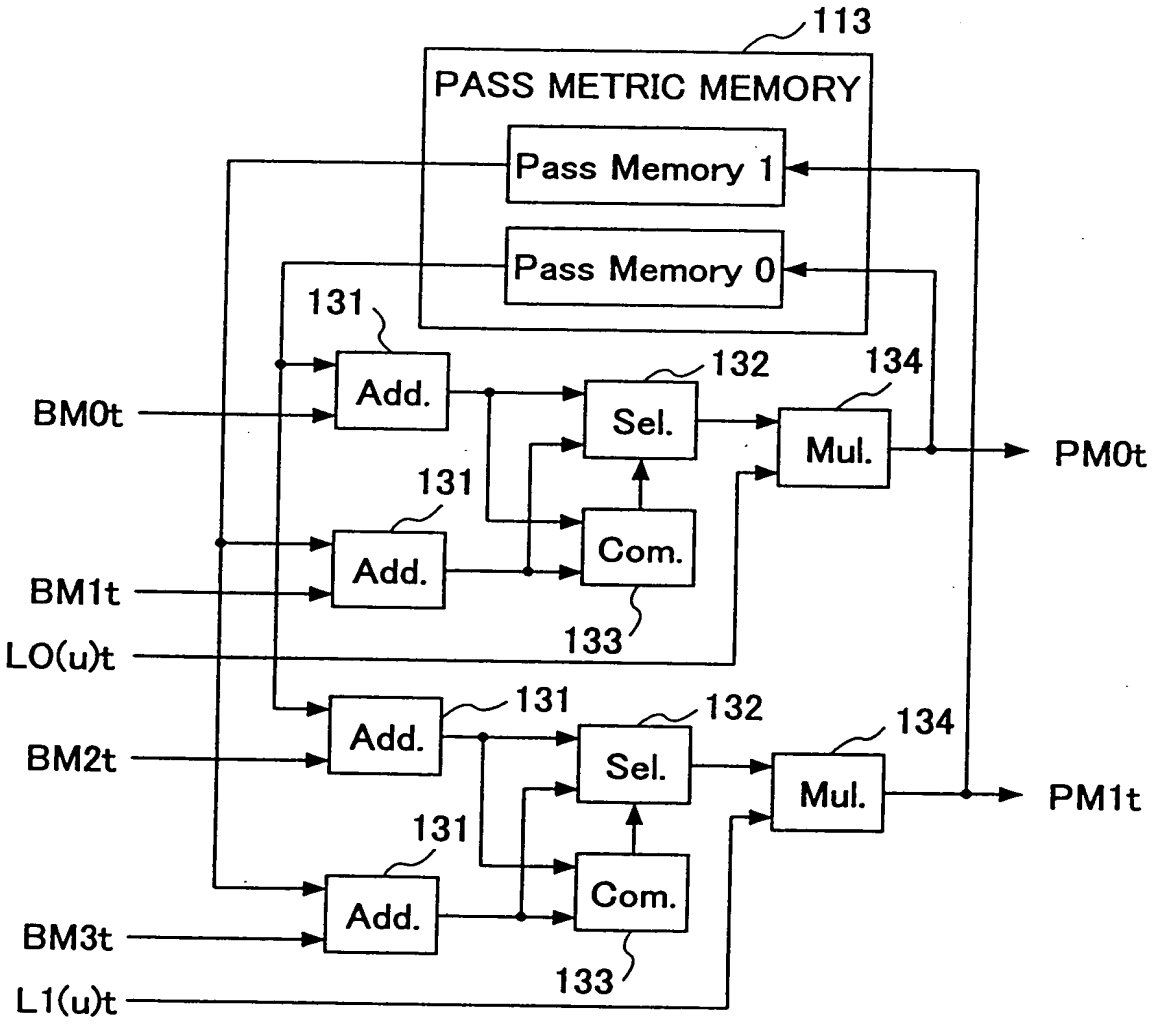
113
PASS METRIC MEMORY
Pass Memory 1
Pass Memory 0
131
Add.
132
Sel.
134
Mul.
BM0t
PM0t
131
Add.
Com.
BM1t
133
LO(u)t
131
Add.
132
Sel.
134
Mul.
BM2t
PM1t
131
Add.
Com.
BM3t
133
L1(u)t

FIG.14

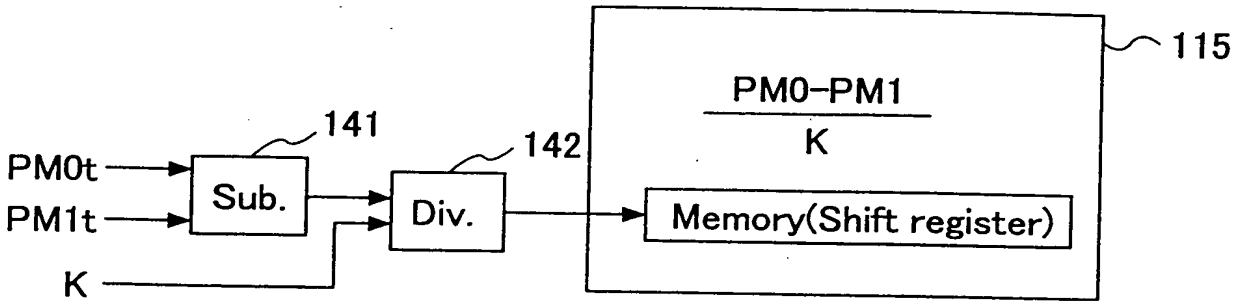

FIG.15

$$L1'(u) = \frac{K-(PM0-PM1)}{K} = 1-\frac{PM0-PM1}{K}$$

$$L0'(u) = \frac{K+(PM0-PM1)}{K} = 1+\frac{PM0-PM1}{K}$$

COMMON FRACTION

FIG.16

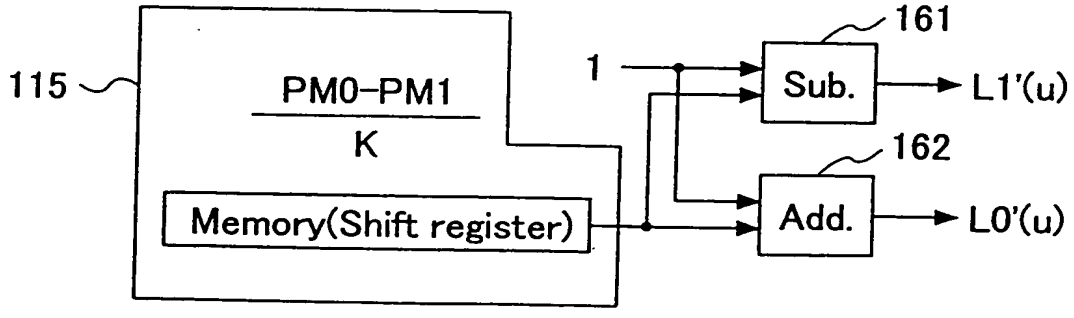

FIG.17

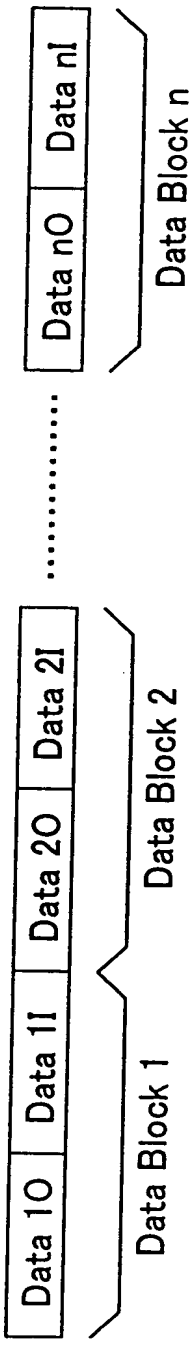
Data 10
Data 11
Data 20
Data 21
Data Block 1
Data Block 2
Data nO
Data nl
Data Block n
Data nO:Original data
Data nl:Interleave data

FIG.18A

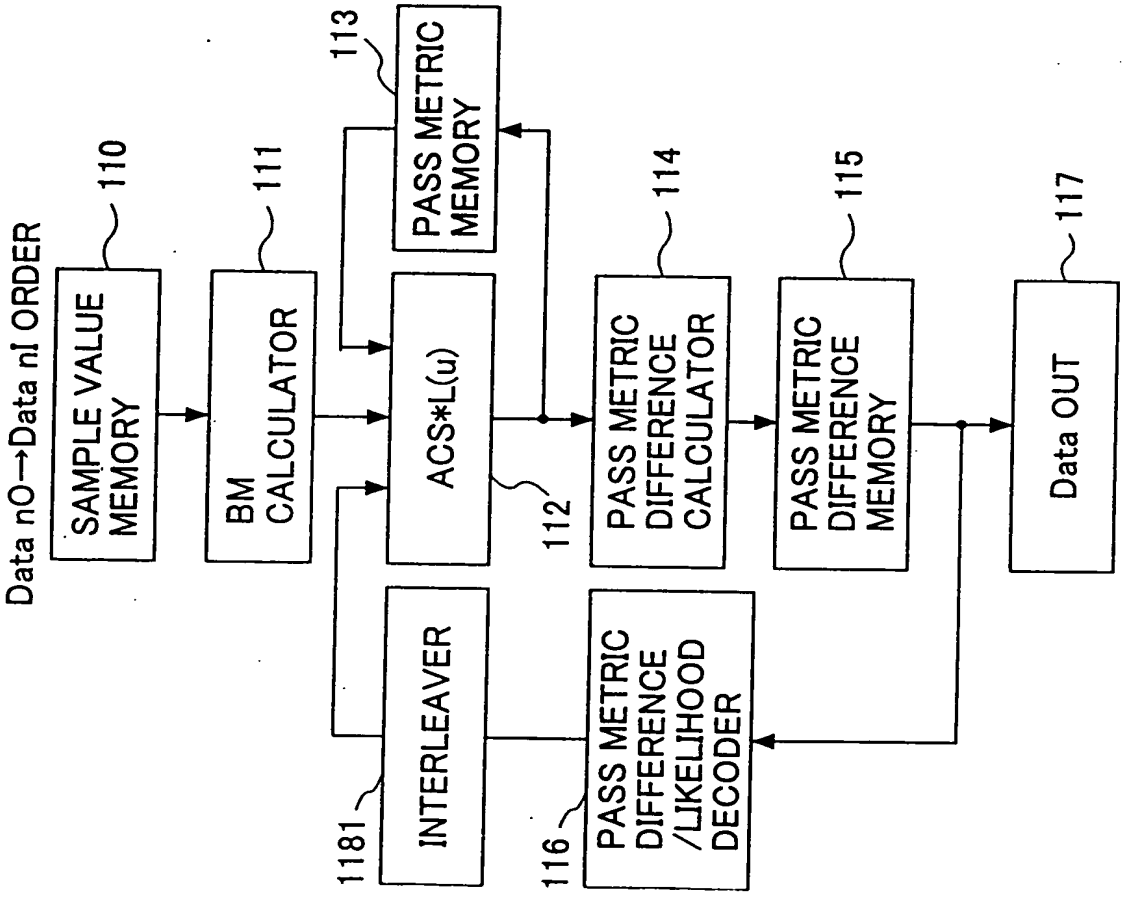

FIG.18B

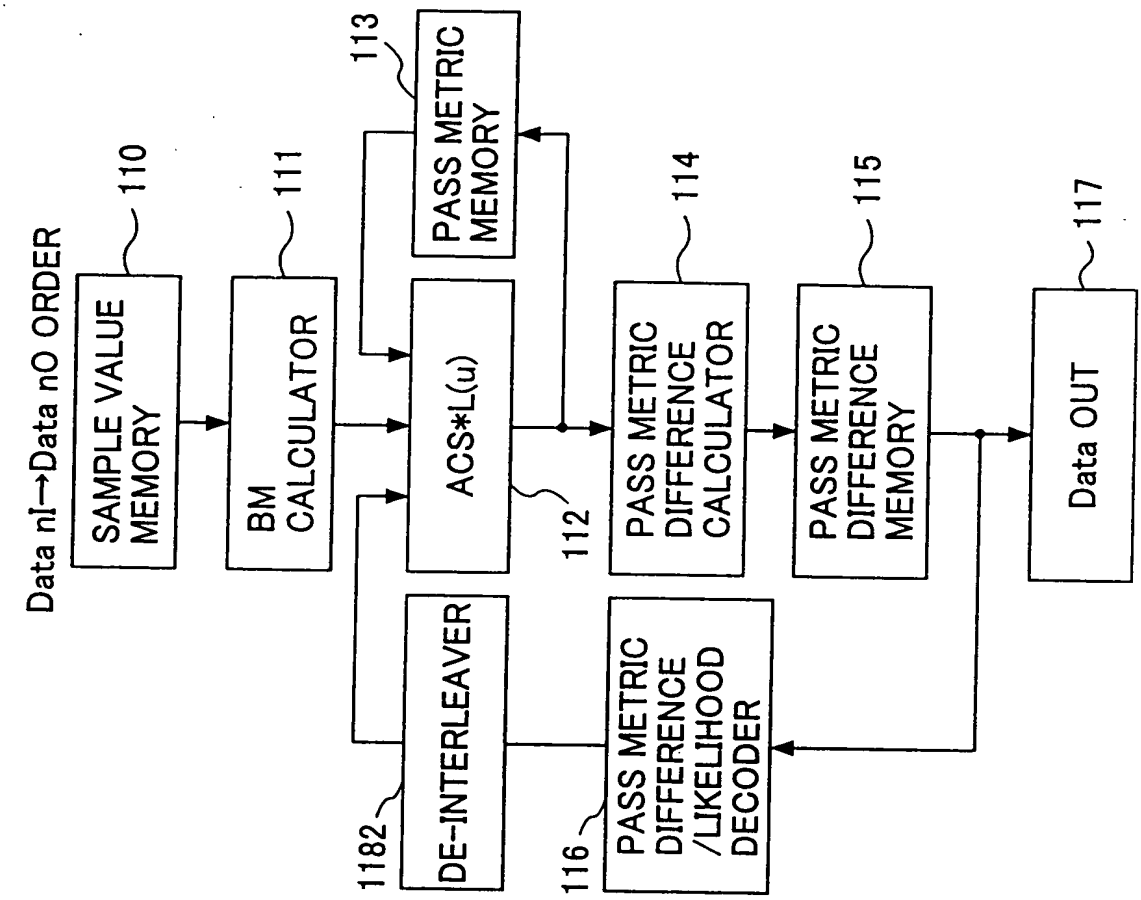

FIG.19

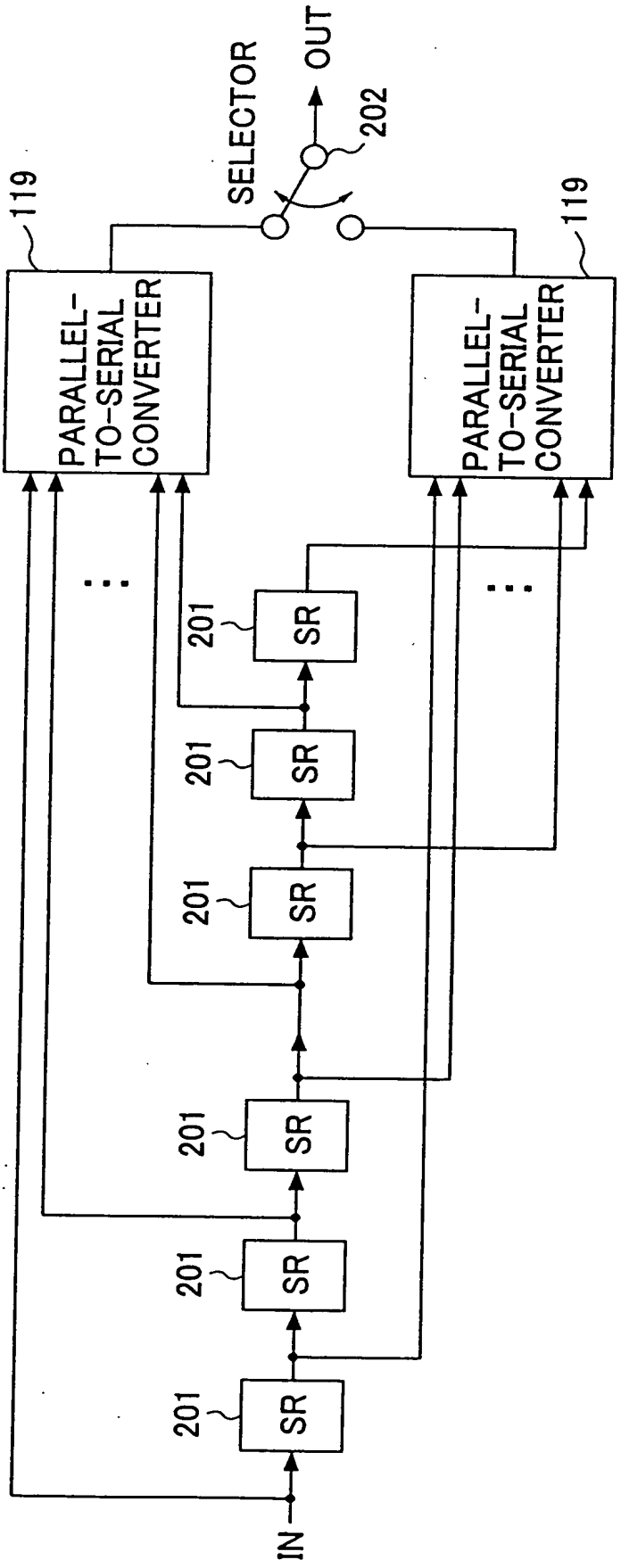
SELECTOR
OUT
202
119
119
PARALLEL-TO-SERIAL CONVERTER
PARALLEL-TO-SERIAL CONVERTER
201
SR
IN

FIG.20

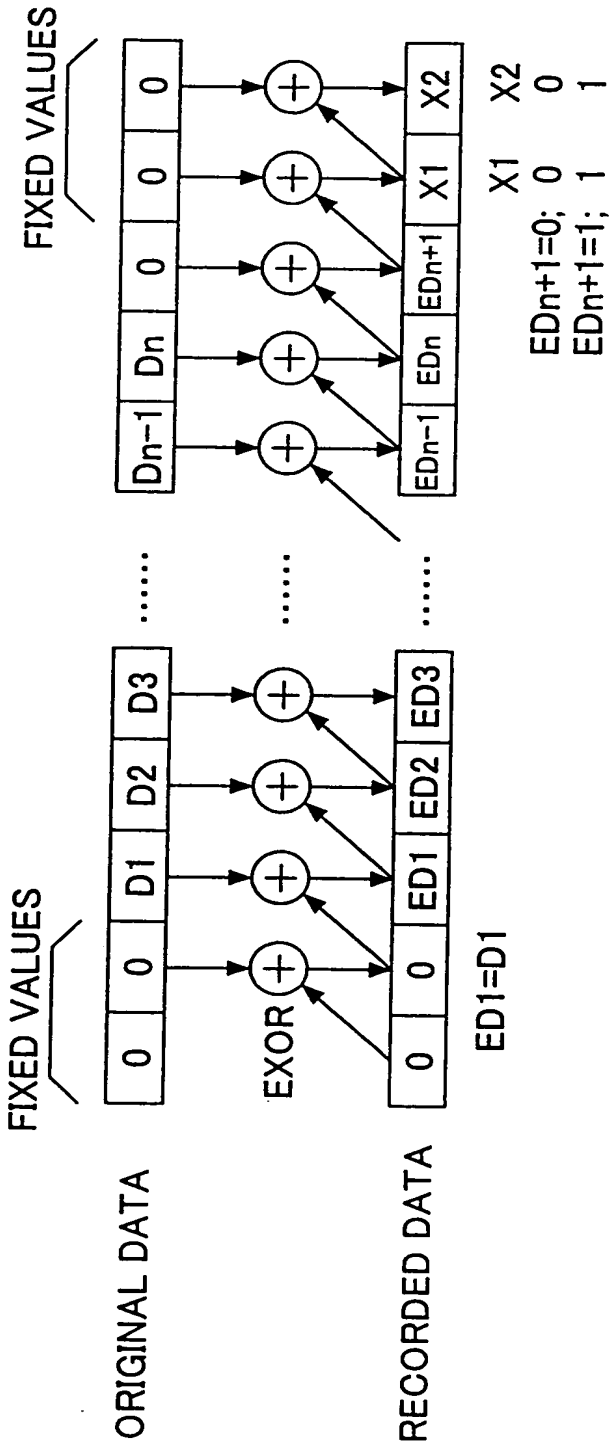
FIXED VALUES
ORIGINAL DATA
0
0
D1
D2
D3
EXOR
RECORDED DATA
0
0
ED1
ED2
ED3
ED1=D1
FIXED VALUES
Dn-1
Dn
EDn-1
EDn
EDn+1
X1
X2
X1 X2
EDn+1=0; 0 0
EDn+1=1; 1 1

FIG.21

A	EXOR	B	→	C
0		0		0
0		1		1
1		0		1
1		1		0

PROBABILITY PA (0) THAT A IS "0"
PROBABILITY PA (1) THAT A IS "1"

PROBABILITY PB (0) THAT B IS "0"
PROBABILITY PB (1) THAT B IS "1"

PROBABILITY PC (0) THAT C IS "0"
PROBABILITY PC (0) THAT C IS "1"

PA(0)+PA(1)=1
PB(0)+PB(1)=1
PC(0)+PC(1)=1

$$PC(0)=PA(0)*PB(0)+PA(1)*PB(1) \quad --(1)$$
$$PC(1)=PA(0)*PB(1)+PA(1)*PB(0) \quad --(2)$$

FROM EXPRESSION (1)

$$PC(0)=(1-PA(1))*(1-PB(1))+PA(1)*PB(1)$$
$$=1-(PA(1)+PB(1)-2*PA(1)*PB(1))$$

FROM EXPRESSION (2)

$$PC(1)=(1-PA(1))*PB(1)+PA(1)*(1-PB(1))$$
$$=PA(1)+PB(1)-2*PA(1)*PB(1)$$

FIG.22

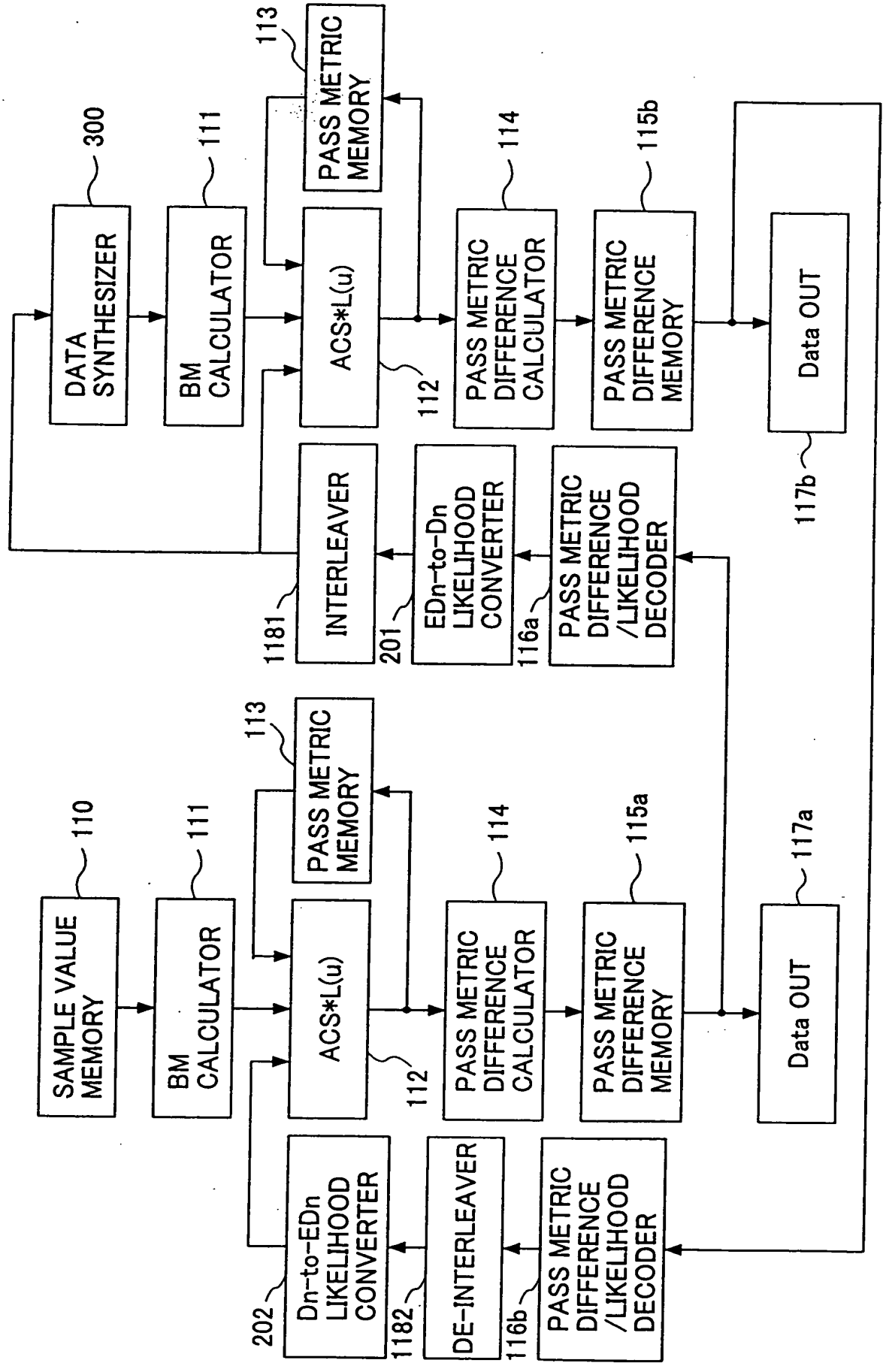
DATA SYNTHESIZER
300
BM CALCULATOR
111
ACS*L(u)
112
PASS METRIC MEMORY
113
PASS METRIC DIFFERENCE CALCULATOR
114
PASS METRIC DIFFERENCE MEMORY
115b
Data OUT
117b
INTERLEAVER
1181
EDn-to-Dn LIKELIHOOD CONVERTER
201
PASS METRIC DIFFERENCE /LIKELIHOOD DECODER
116a
SAMPLE VALUE MEMORY
110
BM CALCULATOR
111
ACS*L(u)
112
PASS METRIC MEMORY
113
PASS METRIC DIFFERENCE CALCULATOR
114
PASS METRIC DIFFERENCE MEMORY
115a
Data OUT
117a
Dn-to-EDn LIKELIHOOD CONVERTER
202
DE-INTERLEAVER
1182
PASS METRIC DIFFERENCE /LIKELIHOOD DECODER
116b

FIG.23

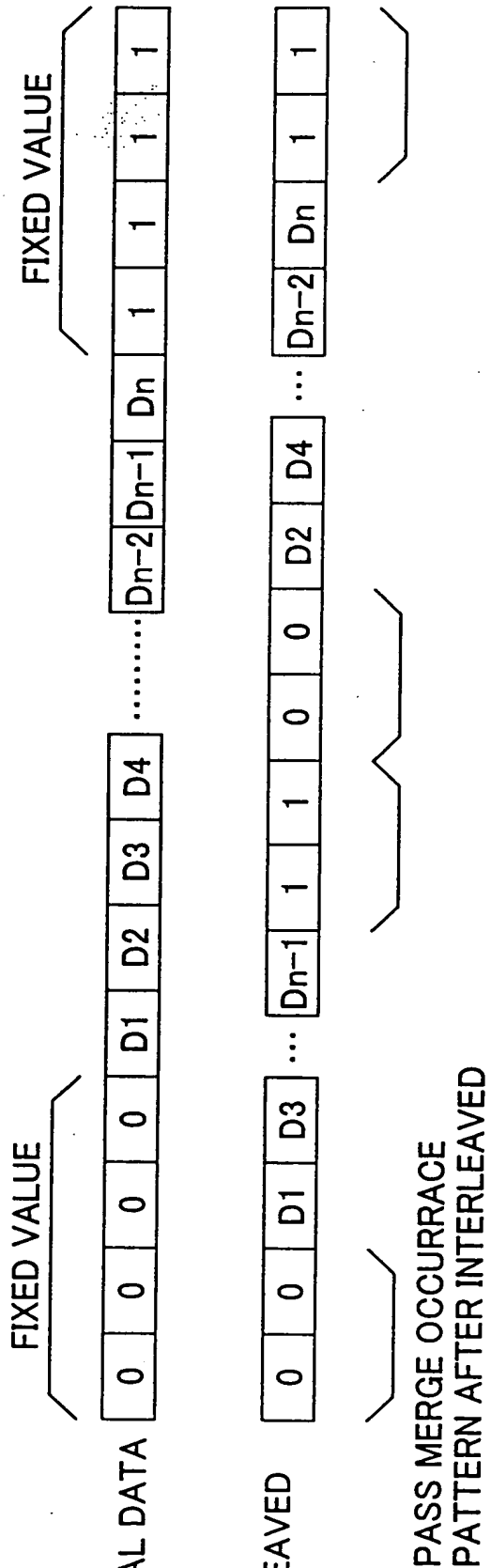
FIXED VALUE
FIXED VALUE
ORIGINAL DATA
INTERLEAVED DATA
PASS MERGE OCCURRACE PATTERN AFTER INTERLEAVED
0 0 0 0 D1 D2 D3 D4 ..... Dn-2 Dn-1 Dn 1 1 1 1
0 0 D1 D3 ... Dn-1 1 1 0 0 D2 D4 ... Dn-2 Dn 1 1

FIG.24

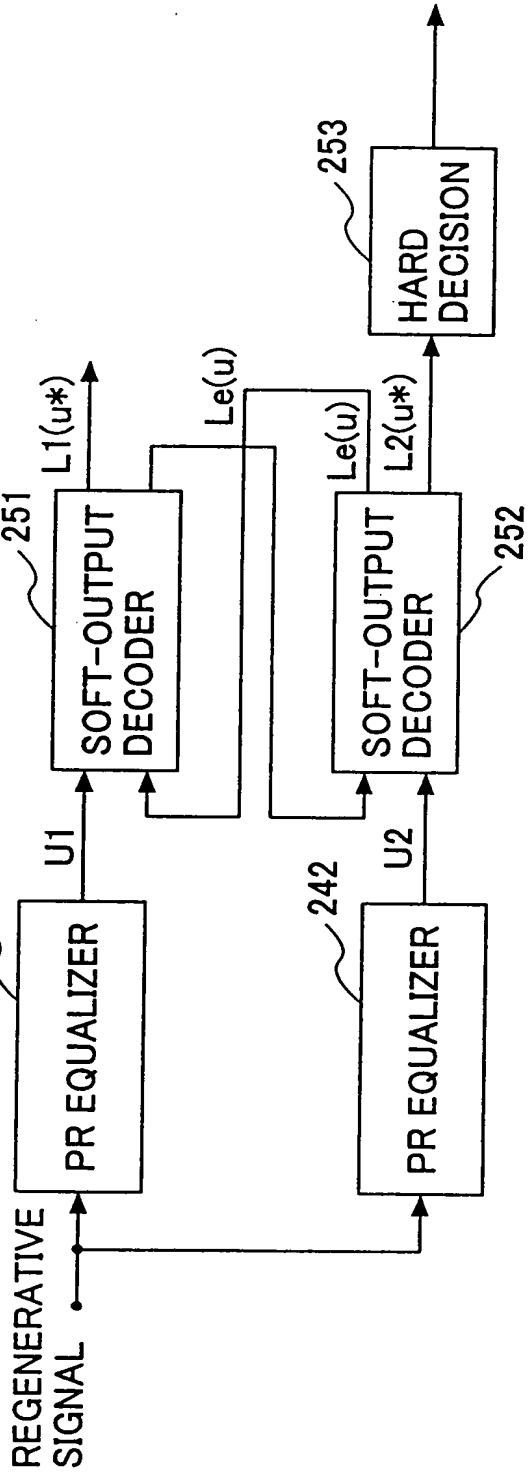
REGENERATIVE SIGNAL
241
PR EQUALIZER
242
PR EQUALIZER
U1
U2
251
SOFT-OUTPUT DECODER
252
SOFT-OUTPUT DECODER
L1(u*)
L2(u*)
Le(u)
Le(u)
253
HARD DECISION

FIG.25

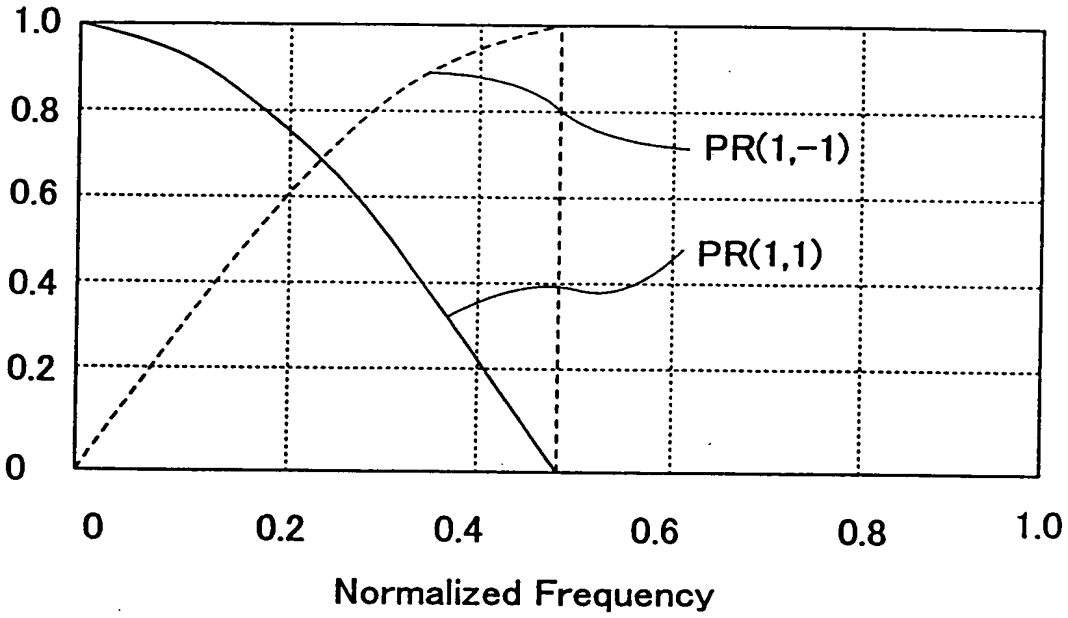
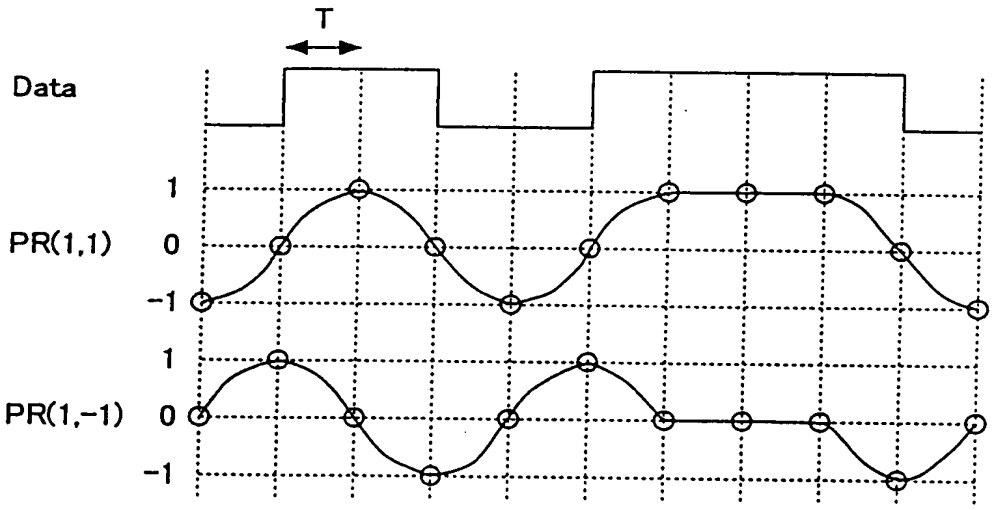
FIG. 26